Assisted Approach as a Tool for Increasing Attention When Using the iPad in a Special Elementary School: Action Research

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Abstract—Nowadays, mobile touch technologies, such as tablets, are an integral part of teaching and learning in many special elementary schools. Many special education teachers tend to choose an iPad tablet with iOS. The reason is simple; the iPad has a function for pupils with special educational needs. If we decide to use tablets in teaching, in general, first we should try to stimulate the cognitive abilities of the pupil at the highest level, while holding the pupil's attention on the task, when working with the device. This paper will describe how student attention can be increased by eliminating the working environment of selected applications, while using iPads with pupils in a special elementary school. Assisted function approach is highly effective at eliminating unwanted touching by a pupil when working on the desktop iPad, thus actively increasing the pupil's attention while working on specific educational applications. During the various stages of the action, the research was conducted via data collection and interpretation. After a phase of gaining results and ideas for practice and actions, we carried out the check measurement, this time using the tool-assisted approach. In both cases, the pupils worked in the Math Board application and the resulting differences were evident.

Keywords—Special elementary school, mobile touch device, iPad, attention, math board.

I. INTRODUCTION

A special elementary school is considerably different from mainstream schools, especially with regard to the use of specialized educational resources and organizational forms of education (e.g., strongly individual approach, lessons divided into several units ...), and also by the structure and the composition of the framework curriculum [3].

Pupils whose level of cognitive development does not permit them to flourish in an elementary school, nor in a special primary school are educated in suitably modified conditions with specialized professional pedagogical care and individualized curricula. With assistance and specialized technological support they are able to assume the basic knowledge and skills needed to understand the outside world and achieve the maximum possible degree of independence and participation in social life. [4]. We can say that this way of education is adjusted to pupils with reduced levels of cognitive ability, psychological oddities and a low level of volitional qualities development. It is reported, that the ICT management of this group will be varied; although, most children will not be able to work independently.

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If we decide to implement any form of teaching ICT, it should be clear, in what teaching phase will we utilize it, and for what purpose or outcome do we mean to use it? Do we want to motivate? Do we want to use ICT as a form of reward? Or do we want to use ICT for work that pupils cannot undertake using common tools? In this case, we should get maximum attention so that the resulting action makes sense. In this context, we mention working with a mouse or other pointing device, working with the keyboard, or turning on the PC [8]. Mobile touch devices such as an iPad are different in that pupils from special elementary schools are able to learn to control the functions and manipulate screens independently. For example, when they touch the display, the keyboard appears, and when they click on a specific key they can immediately see what they wrote without changing the angle of view [13].

II. TABLETS IN SPECIAL ELEMENTARY SCHOOLS

Tablets themselves do not make for a better learning process, and those who think that they do, are mistaken. It is always necessary to keep in mind several aspects; the main one is the knowledge of the tablet usage and the teacher's ability to use technology effectively to enhance student learning. In the study called, "*What the Research Says: Teaching and Learning with the iPads*" it is argued that technology alone does not have much influence on the process or learning outcomes [7].

Tablets are very attractive to pupils. Working with tablets, can be very motivating for pupils, compared to common conventional teaching resources and approaches. Tablets and iPads are particularly motivating due to their interactivity [16]. Tablets are a useful assistive technology for pupils; students find them engaging and motivating, they facilitate student work, adapt to a pupil's own speed, and can help with homework [2]. The study, "*Special Education Teachers' Lived Experiences in the Implementation of the iPad as an Instructional Tool for Students with Intellectual Disabilities*", indicates that iPads, when used as a teaching aid for pupils with moderate mental disabilities, significantly increases attention at work [12]. In the future, modern educational technology will be a means of support, assistance, motivation, and may serve to provide information in the educational process [1].

A. Assisted Approach (Also Guided Access)

Factors that can disrupt working with iPad are [10]:

– pupils' curiosity,
– faster way of working of students,
– not focusing on the working environment applications,
– control of the iPad, which is unwanted (incorrect pressing home button, etc.),
– intentional disruption of work, and
– unwanted manipulation with the iPad.

Assisted approach allows the student to focus on one thing when using the iPhone, iPad or iPod touch. Assisted approach limits the devices on a single application and allows you to set which functions of the application should be available [9]. Assisted approach helps students with autism, attention deficit disorder, and other sensory disabilities to maintain focus while working on the prescribed task. Teachers or therapists can manipulate iOS devices so that they remain on one particular app by disabling the Home button, and can even confine touch input to certain parts of the screen. If the function Assisted approach is active, a pupil can fully concentrate solely on the work environment of the applications. This eliminates adverse effects and extra stimulation. Wherever a student touches the screen, the function of working with the application remains undisrupted.

B. Math Board Application

Math Board application is a highly configurable math application appropriate for all school-age children. Beginning in kindergarten with simple addition and subtraction operations, through to elementary school where pupils learn multiplication and division, etc. Math Board allows you to configure the application to best match the abilities of the individual pupil. It contains a number of function buttons which are located in the working environment of the application [11].

III. ACTION RESEARCH

The dictionary definitions of Action Research (Eng. Action Research, Ger. Aktionsforschung) normally indicate that action research aims to improve certain aspects of the educational experience [5].

A definition of action research states that it is a systematic reflection of an educator: "In action research there are essential elements, actions, reflection and revision" [14]. Implementation of action research was realized according to the schedule in [15] and included the following stages: input into research, observation and collection of information, data interpretation and practical theory formulation, objectives and criteria assessment, implications and other ideas for practice – interventions design, actions, formulation, and presentation of experiences. The level of action research took place at the "micro level", which means at schools. The action research of teaching is when a teacher implements an action research of teaching in a class, examines his teaching as a prerequisite for student learning and introduces innovations in the class [14]. It is called an action research, because a teacher who decided to use in the teaching process a new textbook (or in our case tablets), can determine whether the new textbooks are more effective than antecedent textbooks [14].
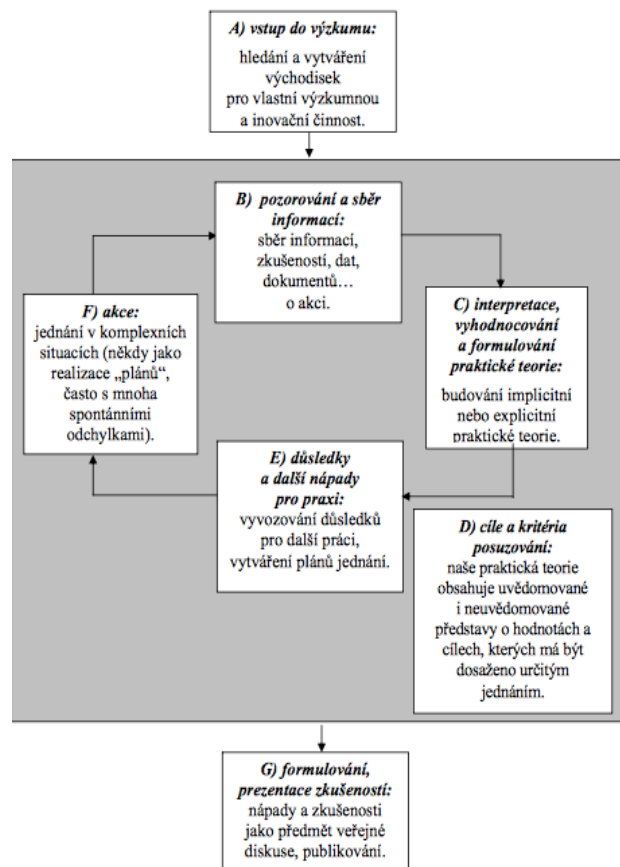

Fig. 1 Stages of Action Research, adapted from [15]

English translation of the content of Fig. 1 is as:
A) Entry into research: Searching and creating the bases for their own research and innovation activities,
B) Observation and collection of information: Collection of information, experiences, data, documents about action,
C) Interpretation, evaluation and formulation of practical theory: building of implicit or explicit practical theory,
D) Aims and assessment criteria: Our practical theory contains perceived and unperceived ideas about values and aims that are supposed to be achieved by a certain action,
E) Consequences and other ideas for practice: Drawing consequences for the next work, creating plans of proceeding,
F) Action: Proceeding in complex situations (sometimes as a realization of "plans" with many spontaneous variances,
G) Formulation of experiences presentation: Ideas and experiences as a subject of public discussion and publication.

A. Implementation of Action Research

1. Entry into the Research

The research problems are students from special elementary schools, subject- Mathematics, educational field - Mathematics and Its Applications, part - number and

numerical operations, field - numbers 0-20 [6], task - practicing addition, subtraction over 10. Implementation - Mobile Touch iPad, application MathBoard. Problem – pupils, when working with MathBoard, are interested in other controls on the screen – each one in a different way; within their fine motor difficulties they often accidentally touch with another part of the palm - the touch of the screen switches a mode on, offers a dialog with the termination option; and the pupils are distracted; with the active participation of a teacher and his monitoring it is not possible to ensure working with selected students at the same time during this activity. Out of the 15 minutes assigned for working with the iPad, the pupils often do not complete the assigned numerical set, which consists of 20 examples.

2. Observation and Collection of Information

For data collection and information, creating video clips of each pupil during his work was used. The pedagogue, at this time, was only an observer and did not interfere in the pupil´s assigned work at all. The aim was to determine how much of the total of 15 minutes was spent on working with the tasks and how much time was spent on other activities.

3. Data Interpretation and Formulation of Practical Theory

Analyzing video recordings showed that the dominant factor influencing working with the application was the uncoordinated movement in fine motor skills. It means that if a pupil accidentally touched the screen somewhere else, it was followed by the application responsiveness, for example: an option to finish the work, a setting option when touching the setting icon; when you touch the pen icon, the application opens a drawing table; however, it makes the pupils upset if they touch the "x" button, the software offers the user to finish the work. If the pupil unknowingly touches "yes", then the whole work is finished. The secondary problem was mainly curiosity, when pupils themselves actively tried the application environments, though they were referred to use the keyboard that the application offers.

The volume of work was as follows:

Total time for 20 tasks - 15 minutes

Resolution of work in the application (rounded to minutes):

- Pupil 1: 11 minutes, all tasks finished.
- Pupil 2: 13 minutes, all tasks finished; one click on the icon "pen", the drawing board was opened, he was able to click on the cross and close it.
- Pupil 3: 15 minutes, 11 tasks finished; by touching the x icon, the dialog window offered to quit: yes - no. He clicked "yes" and then there were many efforts made to return to working on the tasks, unfortunately without success. The application is in English.
- Pupil 4: 15 minutes, eight tasks finished; he clicked on the icon "bulb", which offers a representation of arithmetic operations, the choice of cancel x continue appeared. First he chose cancel, although he returned to his task. After a while, he clicked on the icon bulb again (probably to see if something will switch on) he chose the "continue" option when the window offering a visual representation

pops up. He got into clicking on "done", which returned him back to the task, but this task was marked with a red cross as a miscalculated. It was followed by nonverbal expression of negative emotions - shaking upper limbs. When touched, they will not be followed by any interaction.

Fig. 2 Screen Application MathBoard when touched on the "light bulb" icon

Fig. 3 Screen application MathBoard when touched on the icon "pen"

4. Aims and Assessment Criteria

There was a clear aim to eliminate the function keys of Math Board application to prevent their unintentional activations.

5. Consequences and Other Ideas for Practice

Design interventions – at support.apple.com and apple / education / special-education I have read about the function of Assisted Approach which iPad offers, because it is a feature built. This function comes under the admittance section specifically for pupils with special educational needs. The main aim is to learn to use the Assisted approach and to use it actively, while working with the application, not only in the Mathematics lessons.

Fig. 4 Screen application MathBoard when touched on the icon
"cross-ending"

Pupil	Time limit	Number of finished tasks
Pupil 1	11,0	20
Pupil 2	13,0	20
Pupil 3	15,0	11
Pupil 4	15,0	8

Fig. 5 Time and the finished number of tasks without using assisted
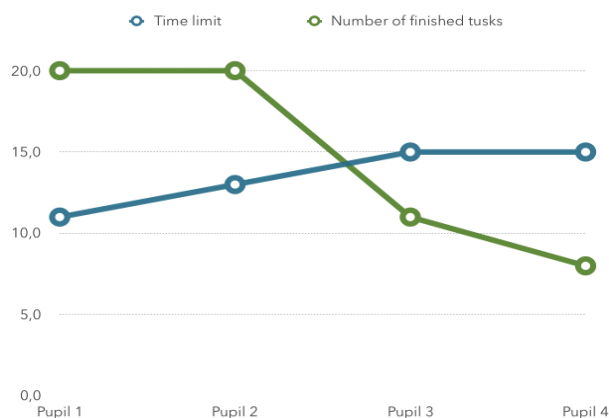approach

Fig. 6 Representation of the final times and the number of finished
tasks without using assisted approach

6. Actions

Realizing working with an active Assisted approach. When using the Assisted Approach you can circle, using your finger, those parts of the desktop, which we want to "deaden". Those parts will be nonfunctional after activation.
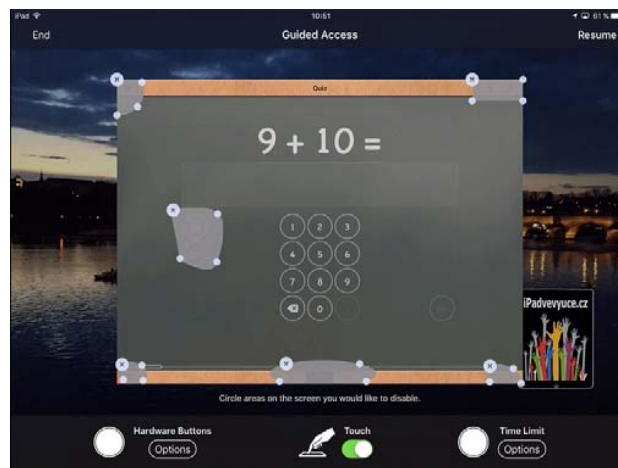

Fig. 7 Screen application MathBoard when assisted approach is set

Fig. 8 Screen application MathBoard when using assisted approach

B. Control Measurements of Working with the Implementation of Assisted Approach

1. Formulation of Experiences Presentation: Ideas and Experiences as a Subject of Public Discussion and Publication

The volume of work was as follows:
Total time for 20 tasks - 15 minutes
Resolution of work in the application (rounded to minutes):

− Pupil 1: 10 minutes, all tasks finished (working rate was about one minute faster, unwanted and inquisitive touches were not observed now, even before the implementation of Assisted approach. After completing the work, the pupil wanted to exit the application by pressing the Home button. No reaction. Therefore, the application remained enabled with the results displayed.

− Pupil 2: 14 minutes, all tasks finished, touching was noticeable even on unfunctional grayed area. But it did not respond. Therefore, the attention was focused on work.

− Pupil 3: 15 minutes, 17 tasks finished; fingers and palms touching were accompanied throughout the whole desktop

application, the display, but without interaction. Attention maintained.

– Pupil 4: 15 minutes, 14 tasks finished; function keys elimination was successful tasks weren´t finished because of timeout. Attention, however, maintained throughout the time limit.

name	Time limit	Number of finished tasks
Pupil 1	10,0	20
Pupil 2	14,0	20
Pupil 3	15,0	17
Pupil 4	15,0	14

Fig. 9 Time and the finished number of tasks with using assisted approach
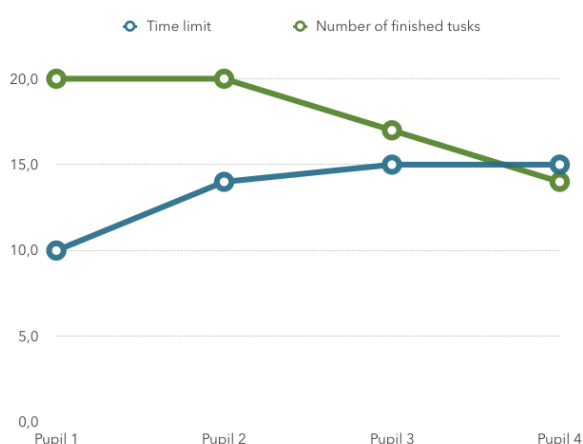

Fig. 10 Representation of the final times and the number of finished tasks with using assisted approach

IV. CONCLUSION

Mobile touch technologies can be very beneficial for pupils when a special education teacher is able to use them to their full potential in combination with sound pedagogical practice. For most pupils, mobile touch technologies are very attractive and engaging. Every child and every pupil is naturally curious. Applications, in their own work environment, offer a large number of aspects which can disrupt the smooth process of pedagogical activity. Therefore, the author thinks it is necessary to be able to eliminate these aspects to ensure student success. If the device has a built-in function, as in our case with Assisted approach, then it is a great advantage for the teacher to be aware of this feature and be able to use it correctly to enhance student learning.

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